



## Feed the Future Country Fact Sheet

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# Technological Innovation Improves Grain Storage for Smallholder Farmers



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Members of the Feed the Future Innovation Lab for the Reduction of Post-Harvest Loss team installing a Solar Bubble Dryer (GrainPro®, USA) in Ethiopia.

Smallholder farmers can often suffer losses in the quantity and quality of grain after harvests due to inadequate storage and drying processes. A critical problem is that after harvest, grain becomes “wet.” That is, the moisture content of the grain exceeds 12 percent of the weight of the grain. Wet grain is dangerous—it’s susceptible to colonization by fungi that can contaminate the grain with mycotoxins and threaten the health of humans and domesticated animals that consume the contaminated grain. Mycotoxins can cause numerous problems including childhood stunting, immune system suppression and even cancer.

Moreover, the tests farmers use to determine grain moisture content are subjective and often not reliable, and can lead to widely varying conclusions.

The Feed the Future Innovation Lab for the Reduction of Post-Harvest Loss, led by Kansas State University, focuses on designing technologies to improve the quality and quantity of grain. In partnership with private sector company John Deere, it has developed a more farmer-friendly, proprietary moisture meter to test grain moisture content, which can help prevent crop loss and infection. John Deere has donated 40 of their handheld moisture meters for field testing in the Innovation Lab’s four core countries: Bangladesh, Ghana, Guatemala and Ethiopia. These meters are also being used in conjunction with drying and storage tests to determine whether grain is dry enough for successful storage.

For grain storage, GrainPro®, a Massachusetts-based company, has partnered with the Innovation Lab to provide Solar Bubble Dryers for testing. This commercially available dryer uses solar energy to power a fan that moves air through the grain to be dried. It also uses solar heat to heat the grain and speed the drying process. The dryers come in 25- and 50-meter lengths that can dry one to several tons of grain at a time. The dryers are being tested in all four core countries under

controlled conditions, and the dryness of the grain before and after drying is assessed with the John Deere and the Innovation Lab's moisture meters to determine their suitability for storage. Grains being tested include wheat, maize, rice, chickpea and sesame, depending upon the country.

Once grain has been adequately dried, the final challenge is keeping it dry and free of fungus and insects. To do this, farmers need bags that hold larger static grain sources and can be opened multiple times. Solutions to these needs are being tested in all four core countries with GrainPro® storage bags (which are commercially available in some locations) and ZeroFly® bags from Vestergaard Frandsen SA in Ghana. The currently available bags hold 25 to 50 kilograms of grain. Preliminary results show that both new types of bags being tested are very effective storage methods and are superior to the bags that are currently used. At current prices these bags are more likely to be used to store seed between seasons than to store grain destined for human or animal consumption. Identifying local manufacturers for these products so that costs can be further reduced is important for sustainable success.

The Innovation Lab's private sector partners are essential to its success. They provide commercially available products for testing in the four core countries to make use of these products—and thus, the benefits of the products—economically sustainable.